

77. Lime is extensively employed for other purposes connected with buildings, besides those which have been here treated of—interior, plain, and ornamental stuccoing, and whitewashing, for example; but as the intention of the present paper is only to illustrate its use in construction, and its application in fortifying the exterior of work against the weather, it is deemed unnecessary to extend it to those particulars.

78. The practical knowledge of the properties of calcareous substances, and necessarily that of lime-burnt, is unquestionably of very high antiquity; for although they appear to have been unknown to the Egyptians and early Greeks, we have, besides the testimony in the sacred writings, the evidence afforded by those remains popularly believed to be the ruins of the Tower of Babel, as well as by parts of those of Babylon and Nineveh, to refer us to much earlier times; and the specimens handed down to us may be judged of as being apparently impervious to decay. But it is in the magnificent works of the ancient Romans we must turn, to see fully the capabilities they afford; for not only in the buildings of that people, but in their great military roads and ways, their lime-mortar still manifests so eminent and scarcely imitable skill. It is from them that we have inherited this important branch of knowledge; for, until the Roman subjugation, it was unknown to the primitive inhabitants of our island, even on those shores where the near vicinity of the European continent, and their consequent superior civilization, might have induced an acquaintance with it. It was they who opened the still unexplored haunts of the quarries of Tadcaster, in Yorkshire, the *calcaria*, as they called them; and some ancient works in this country still exist to testify, together, excellently in British materials and Roman workmanship, where the mortar has exceeded even the bricks in hardness, and remains, to all appearance, proof against the ravages of Time. It is to them, also, that we are indebted for the invaluable ingredient called pozzolana, which was so indispensable in the composition of our aquatic mortars prior to the discovery of the Anglo-Roman Cement, it being in some way similar to that in which, within the last half of the last century, by reflective sagacity and experiment, first revealed the latent powers of the latter estimable material, that they discovered the highly hydrauic properties of the former. Fortunately, we have the writings of scientific men who flourished corvally with those skilful practitioners, to indicate the course of our own endeavours. As the subject of mortar, Vitruvius informs us, that one part of the mass of sand was considered the best proportion; which corresponds with the approved practice about London at the present day, in regard to stone lime. Their water-reinforced consisted of one part lime and two parts pozzolana. According to Pliny, there were failures in some of the buildings of his time, in consequence of a deficiency of lime in their mortar: it appears by him that the mixture of tile dust in the latter was practised in those days, as is now sometimes the case; he states that the addition of one-third of that ingredient greatly improved its quality. We also learn from him that there was a Roman law regarding mortar, which enjoined, that after mixing the ingredients with a small quantity of water, they should, before being put to use, be kept in a covered pit for three years. The custom was then, just before using, to heat it for a length of time, until of a thoroughly uniform consistency; the efficacy of which is satisfactorily proved by modern practice. Pliny distinctly states that while the above-mentioned law was in force, the buildings were not liable to crack. The Romans practiced a method of building corresponding in materials with our concrete: it consisted in packing pebbles and fragments of stone, not bigger than a man's closed hand, into a casing of wood, and running the interstices full with hot lime grout. For stucco-work or plastering, the Greek and Roman architects had certain calcareous compositions denominated *Maltha* (*Maldia*); that of the former is said to have consisted of lime, sand, and milk. The Romans, we are informed by Pliny, was fresh-burnt lime, mixed with wine, and beaten in a mortar with hog's lard and figs; a tenacious compound, acquiring a hardness like marble. Another was composed of the slaked lime, bull's-horn's blood, and powdered forge-scales: before

plastering, the surface of the parts was moistened with oil to assist the adhesion of the stucco. Although so much has been attained, architecturally, about London, since the discovery of Roman cement, the practice of stuccoing externally is by no means one of modern introduction, and not only thus far is the Temple of Jupiter Olympius at Agrigentum a proof, but on comparison we find that the ancients possess a palpable advantage in the three grand essentials of appearance, hardness, and durability. In the instance quoted, the coating is like a fine white marble. Ancient Alexandria as well as Roman remains also afford examples of this practice, and almost impenetrable in their hardness. Of the condition of the building art in our own country, in the early portion of last century, we may approach a conclusion when we read in Batty Langley on Bricklaying, that equal parts of lime and sand were used for inside and 2 to 1 for outside work.

#### RAILWAY INTELLIGENCE.

**Tavistock Railway.**—The intended line of this railway, as laid down in the prospectus issued by the company, is from Tavistock on the high ground above Abbey-bridge, passing just above Ash, in the parish of Whitechurch, crossing the Old Plymouth-road and the New-road, with the valley of the Welkham, about midway between the two-mile stone and Bedford-bridge, across the Old Wheel Franchise, to the foot of the Roborough Inn, and crossing Harrowbeer and the Dartmoor-road, approaching near to the Plymouth and Dartmoor line, which it leaves a little to the left, and continues its course to Crabtree, where it meets the South Devon line about two miles from Plymouth, on the London-road. It is to be a subject of future consideration whether the company shall proceed on the South Devon line to Eldad, or cross it at Crabtree, and have a distinct terminus of their own in Plymouth. The receipts, on the usual principle of calculation, that the facilities of the railway will double the traffic between Tavistock and Plymouth, are expected to realize 260*l.* a week, which, allowing 104*l.* per week as the expense for working the road, will be sufficient for a dividend of 5*l.* per cent. on the contemplated outlay of 150,000*l.* The length of the road will not exceed fifteen miles, even should it be decided to make the terminus in Plymouth, and not more than thirteen, if the line terminates at Crabtree. The Duke of Bedford has offered land for the Tavistock terminus and its approaches, together with so much of his property as the line will pass over; and in addition to this, a donation of 1,000*l.*; and Sir R. Lopes and other landowners are stated to have pledged themselves to afford every facility to the work.

**Railway from Oxford to Banbury and Rugby.**—A meeting took place at the Angel Hotel, Banbury, on Tuesday last, for the purpose of hearing the statements of Mr. Barlow, director, Mr. Brunel, engineer, and Mr. Sanders, secretary, to the Great Western Railway relative to the proposed line from Oxford to Rugby through Banbury. The chair was taken by Dr. Marsham, warden of Merton College. After hearing and questioning the gentlemen connected with the Great Western, the meeting being perfectly satisfied with their statements, it was agreed that the proposed line to Rugby and Banbury, was the most eligible one for the city of Oxford.

**Cambridge and York Railway.**—The promoters of a line of railway from Cambridge to York, through Lincoln, have given up the project, in consequence of the indisposition of the Northern and Eastern Railway Company to act with them, and the same parties are now proposing a line of railway direct from London to York, passing nearly along the line of the great north road, by Biggleswade, Stamford, Grantham, &c., but not by Lincoln.

**Railway Communication.**—It is in contemplation to construct a railway to connect the towns of Poole, Blandford, Bournemouth, and Bridgewater, to be called the English and Bristol Channels Junction Railway.

**Atmospheric Railways in Ireland.**—A company, called the Grand Canal Atmospheric Railway Company, has been formed for laying down a line of atmospheric railway from Dublin to Salinas, in the first instance; and for its general introduction afterwards to the south and west of Ireland. They have concluded their arrangements with the directors of the Grand Canal Company, as to the terms on which they are to be permitted to avail themselves of the facilities which the canal affords. The arrangement is not merely from Dublin to Salinas, but embraces any further portions of the canal which may be found desirable for future extensions. It is said that the terms are one-tenth of the gross receipts of the railway, for such portions of it may be constructed along the canal, and as annual sum of 250*l.* as an acknowledgment of the canal company's rights. There is also a separate arrangement made for the transfer of the canal company's establishment at Portobello to the railway company, for their engines, for which it would be admirably adapted, there being an excellent spacious hotel and extensive offices at Portobello. The prospectus is expected to appear in a few days. A deputation has been appointed to proceed to London forthwith, to enter into communication with the Board of Trade upon the subject.—*Herald.*

**Great Western Railway.**—The competition between the Great Western and South-Western companies is likely to increase very materially the facilities of railway travelling. A very important branch, connecting the two lines, is now projected by the Great Western Company; and at a meeting, held at Devizes last Saturday, the details were explained. The line is to commence between Chippenham and Corsham at a place called Thingley, pass through Melksham (with a diverging line to Devizes), Staverton, Trowbridge, by Warminster, Westbury Leigh, and along the vale of Willey to Salisbury, where a south-western branch is to terminate. The distance is 52 miles, the estimated cost about 10,000*l.* a mile, and the Great Western Company offer to take a quarter, a half, or the whole of the shares, or any other part, after local parties have subscribed, and to guarantee 3*l.* per cent. to the shareholders.

**Railway over the Menai Straits.**—We noticed the project of carrying the Chester and Holyhead Railway over the Menai Straits; but we now learn that the landed proprietors in the vicinity oppose the railway, and it is therefore probable the passage across the straits will have to be made at the Britannia rock, and will involve, at least, two arches of 360 feet span. This will be the most gigantic railway work ever undertaken.—*Birmingham Journal.*

A local committee has been formed, and vigorous steps have been taken, with a view to obtain an Act in the next session of Parliament, for the formation of a branch railway from the Great Western line, at or near Bath, to Salisbury. There will then be two important termini, one from the South-Western, and the other from the Great Western Railways.

**Leeds and Thirsk Railway.**—The prospectus for this projected line has been issued, but we cannot believe that it is seriously intended to carry out the formation of the line.—*Yorkshire Gazette.*

**The Lincoln Railways.**—The understanding between the Manchester and Leeds Railway Company and the Eastern Counties Company, to co-operate, and to make their lines meet in Lincolnshire, has been broken off.

The capital of British railways now exceeds sixty millions sterling, and yields a revenue of six millions per annum.

The Cheltenham and Great Western Railway Bill has received the Royal assent.

Hambury is fast rising up from the ashes of 1842. Notwithstanding the vast number of buildings that have been erected, great activity is still prevailing in various parts of the city, and houses are rearing their heads, where, but a few days before, nothing was to be seen but the remnants of former habitations.